



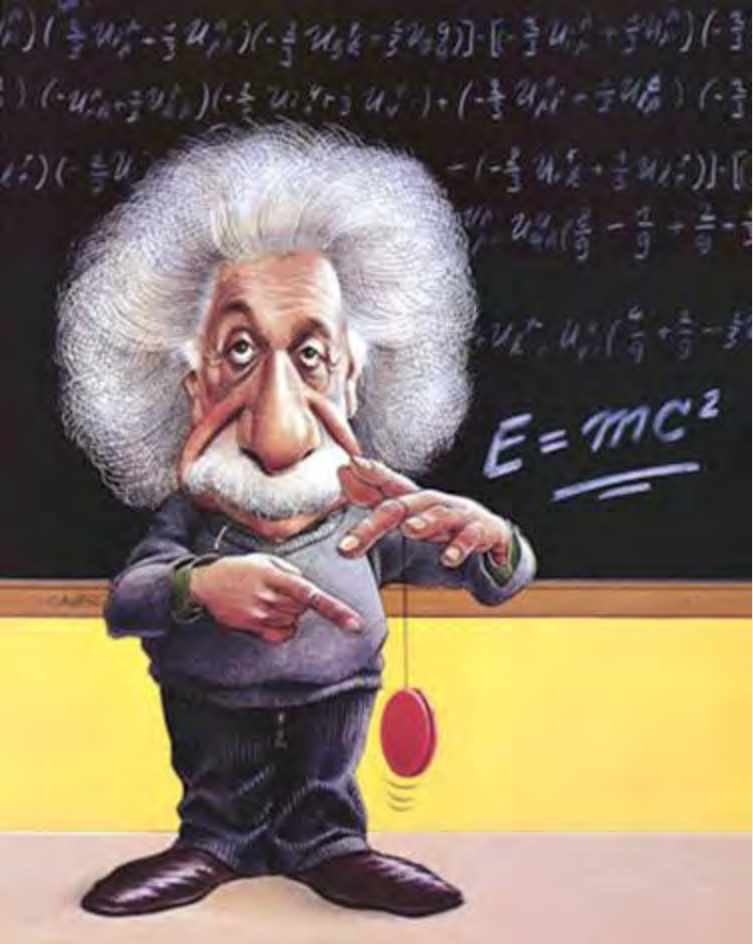
Jean Howard & Pat Baltzley



Mathematics Instruction Promoting Success
on Assessments

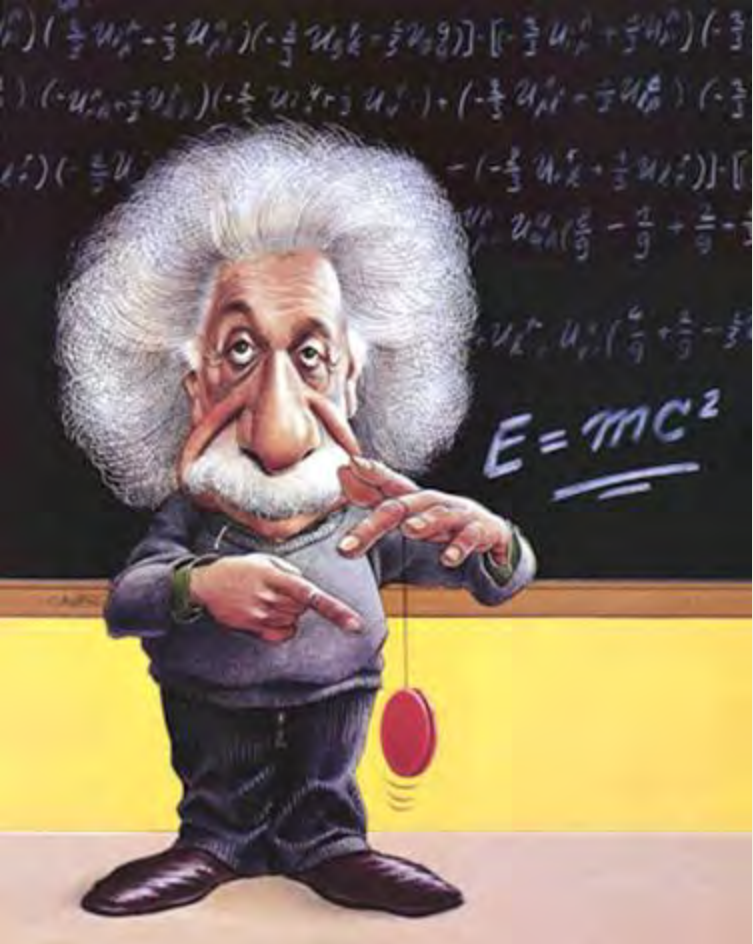
Welcome!

- Thank you for joining us!
- Please write down three questions you have about the SMARTER Balanced Assessment and its impact on instruction.
- Set the questions aside and hopefully we will answer them during this presentation. If not, we will address the remaining questions at the end of the presentation.



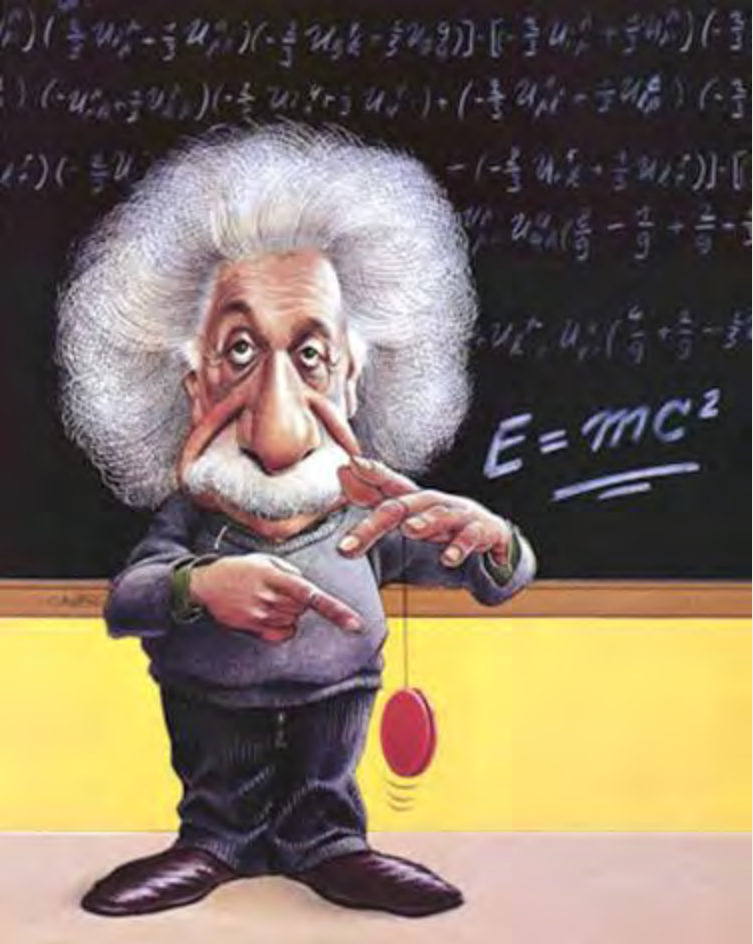
Just Like Me!

I have attended a Montana
Common Core Standards
workshop before



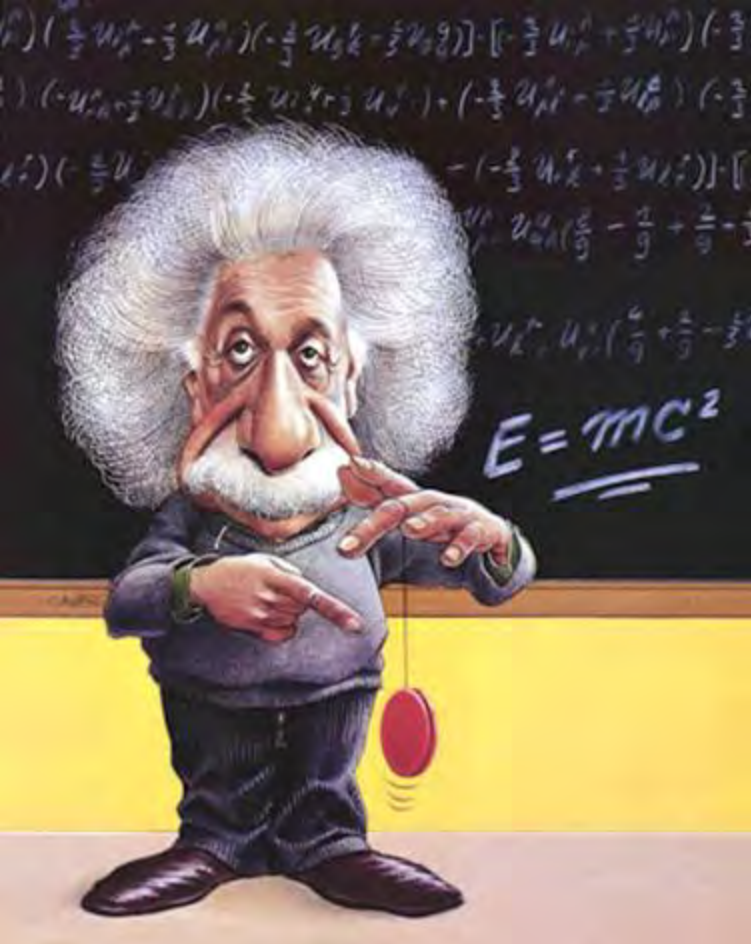
Just Like Me!

I have accessed the OPI
Montana Common Core
Standards website



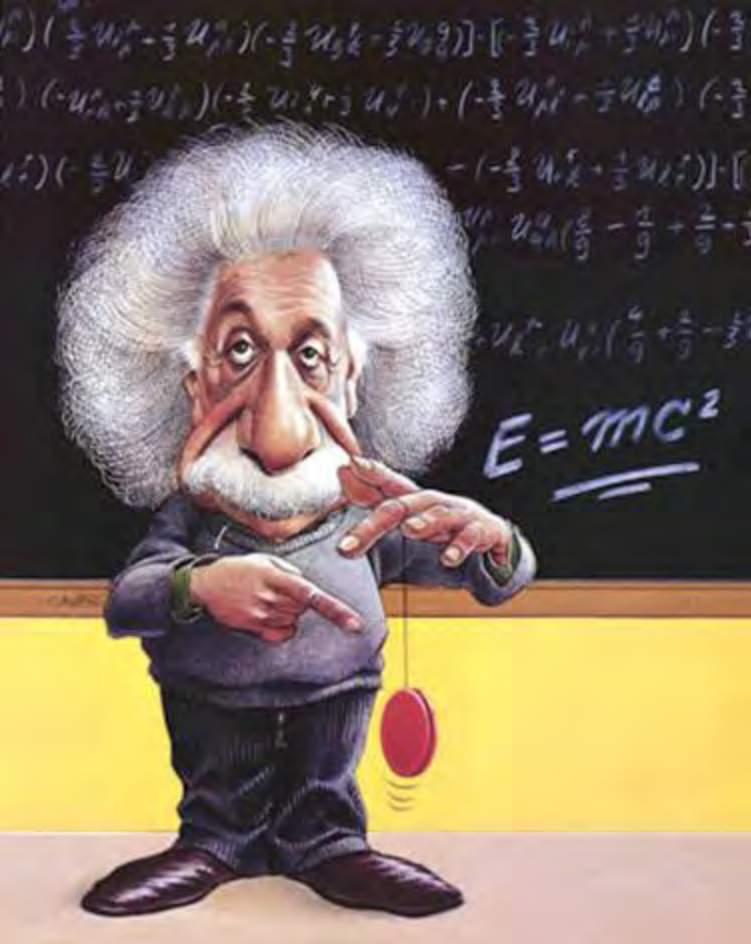
Just Like Me!

My district has discussed and/or
worked with Smarter Balanced
Assessment Information



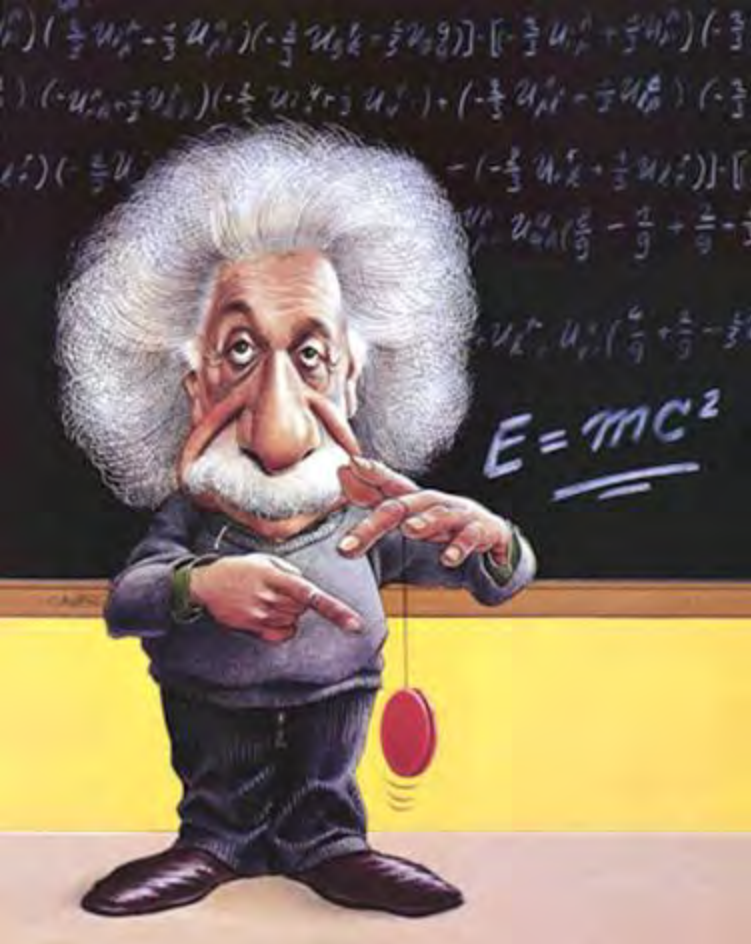
Just Like Me!

I am a k-5 grade teacher



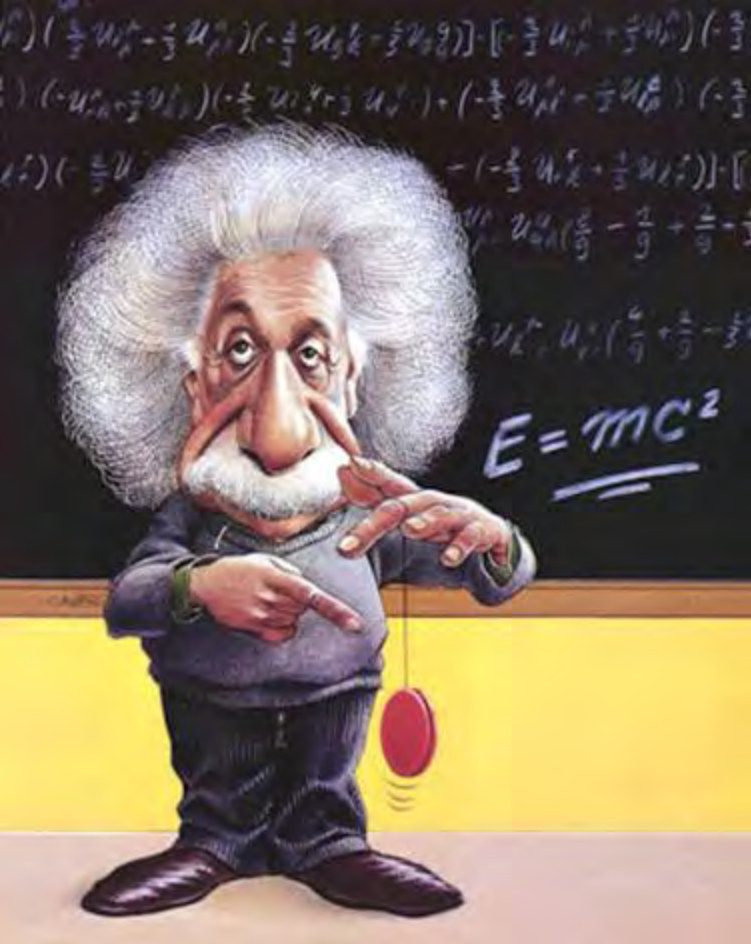
Just Like Me!

I am a 6-8 grade teacher



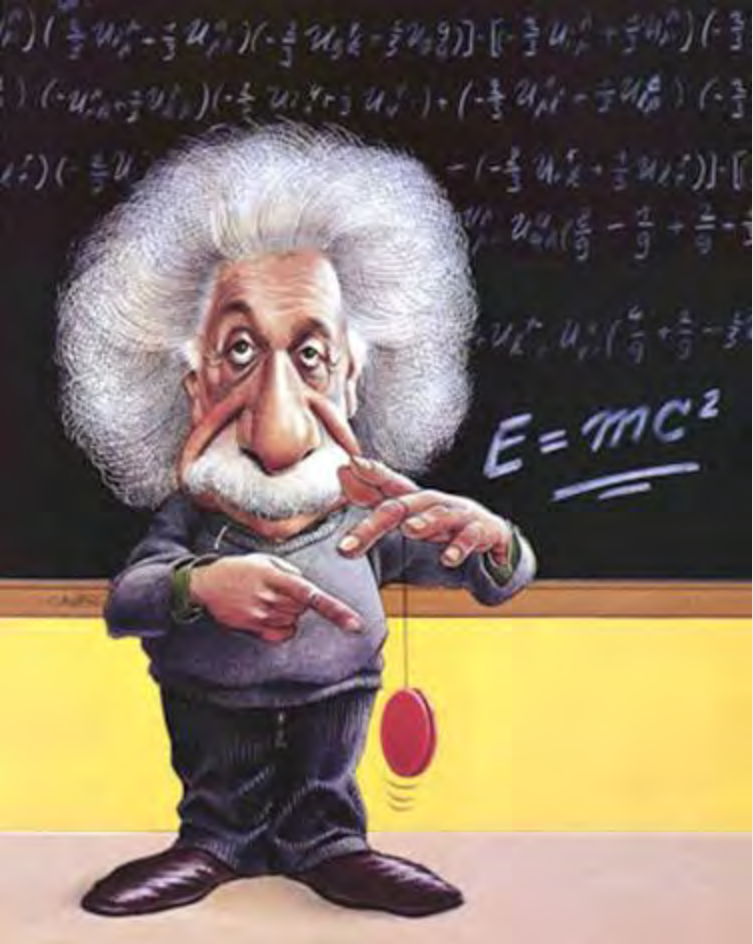
Just Like Me!

I am a 9-12 grade teacher



Just Like Me!

I am an administrator



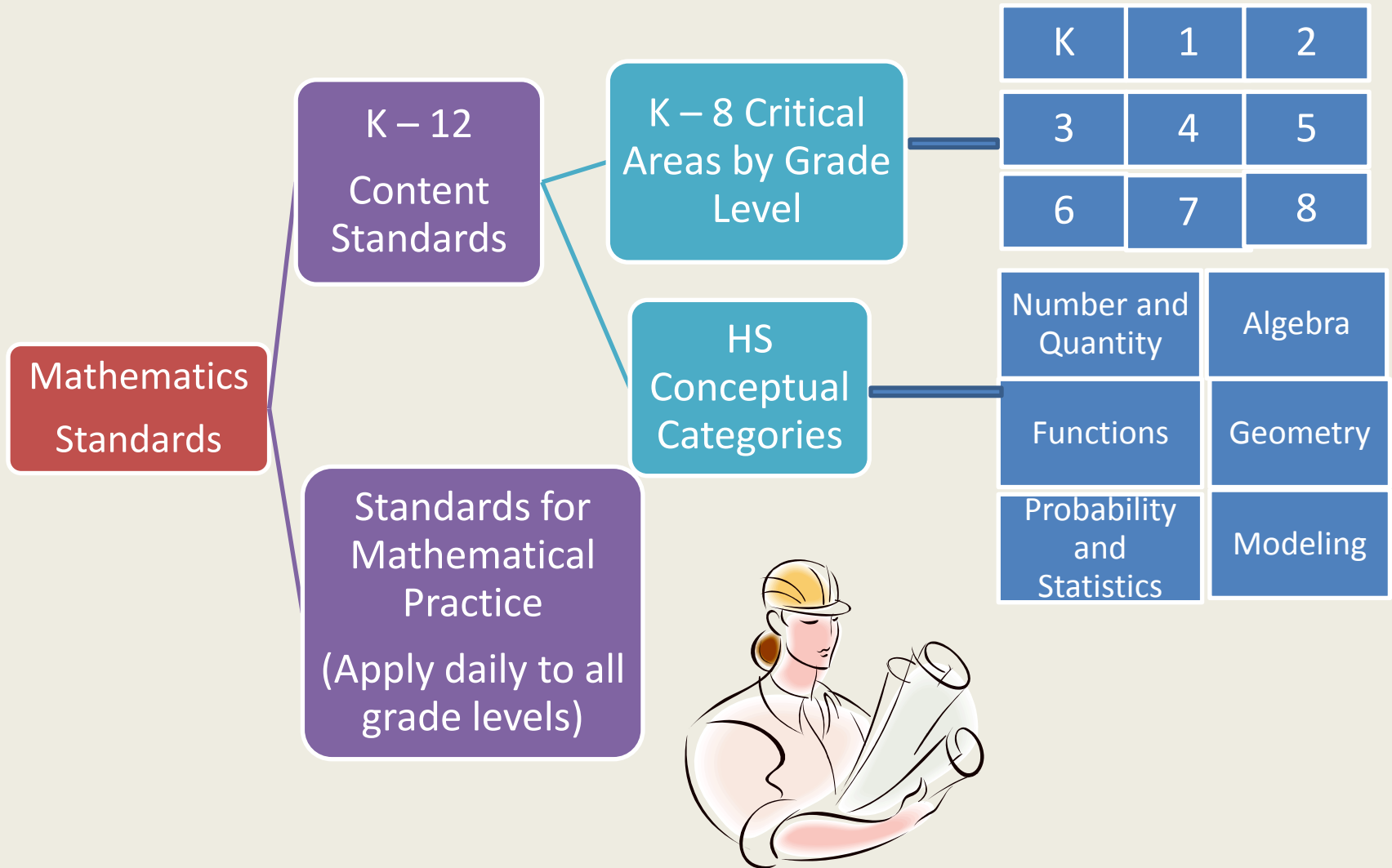
Just Like Me!

I am a curriculum
director/coach or other staff

Goals for this session

- Overview of Montana Common Core Standards (MCCS) and Smarter Balanced Assessment
- Familiarization with the Smarter Balanced online Practice Test
- Discussions on instructional practices using standards documents and sample SBAC items

Mathematics Common Core Structure



Grouping the practice standards

1. Make sense of problems and persevere in solving them

6. Attend to precision

2. Reason abstractly and quantitatively

3. Construct viable arguments and critique the reasoning of others

4. Model with mathematics

5. Use appropriate tools strategically

7. Look for and make use of structure.

8. Look for and express regularity in repeated reasoning.

Reasoning and explaining

Modeling and using tools

Seeing structure and generalizing

Shifts in Mathematics

1. **Focus:** Focus strongly where the standards focus
2. **Coherence:** *Think* across grades, and *link* to major topics
3. **Rigor:** In major topics, pursue *conceptual understanding*, procedural skill and *fluency*, and *application*

FOCUS

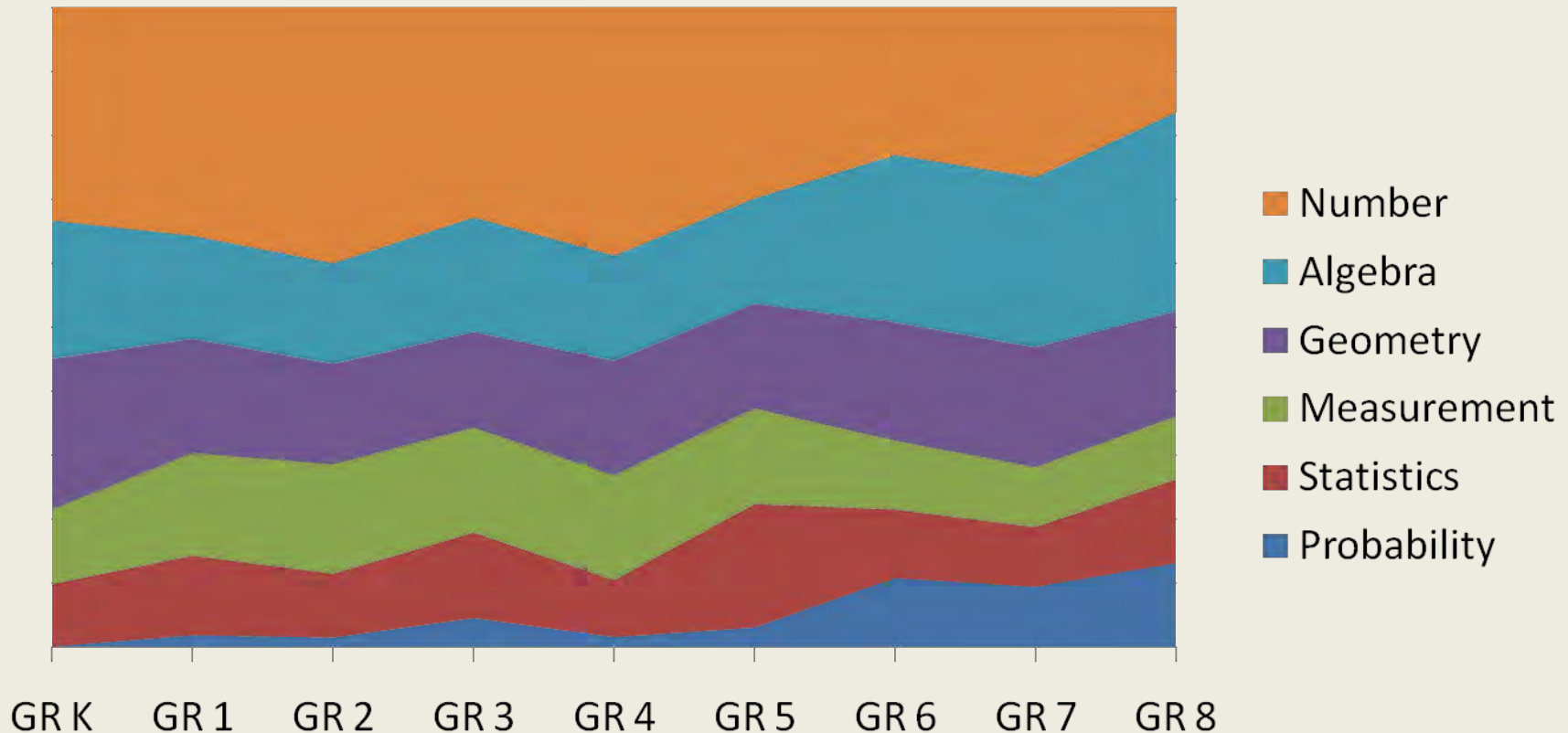
Focus strongly where the standards focus



Montana
Office of Public Instruction
Denise Juneau, State Superintendent

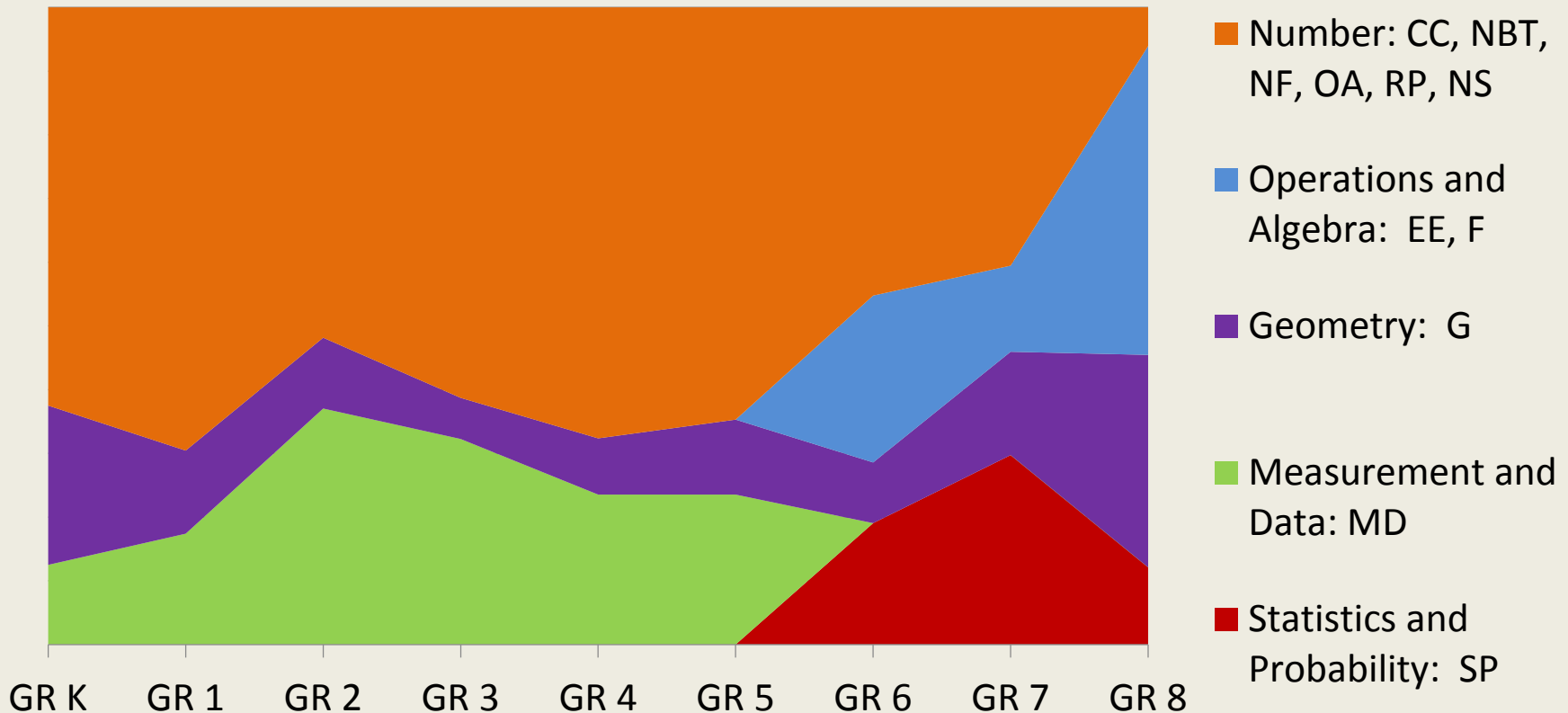
Previous State Standards- Grades K-8

Content of Previous State Standards



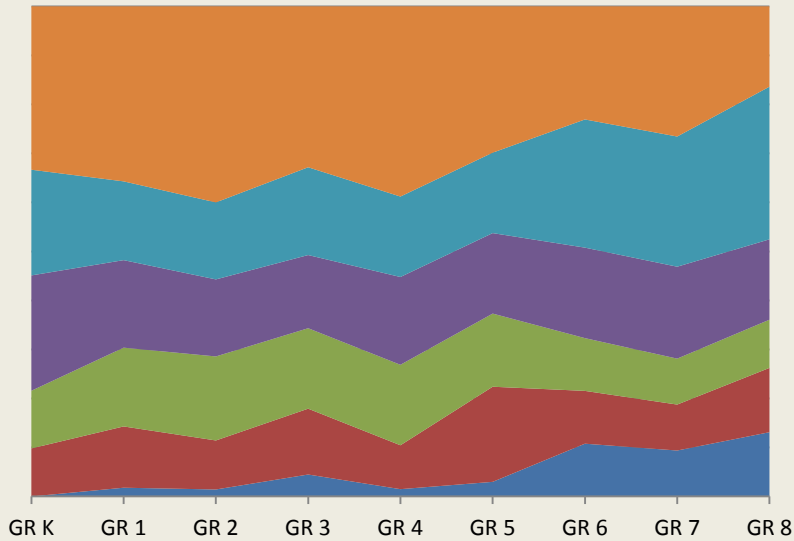
MCCSM Overview – Grades K-8

Content of Common Core State Standards

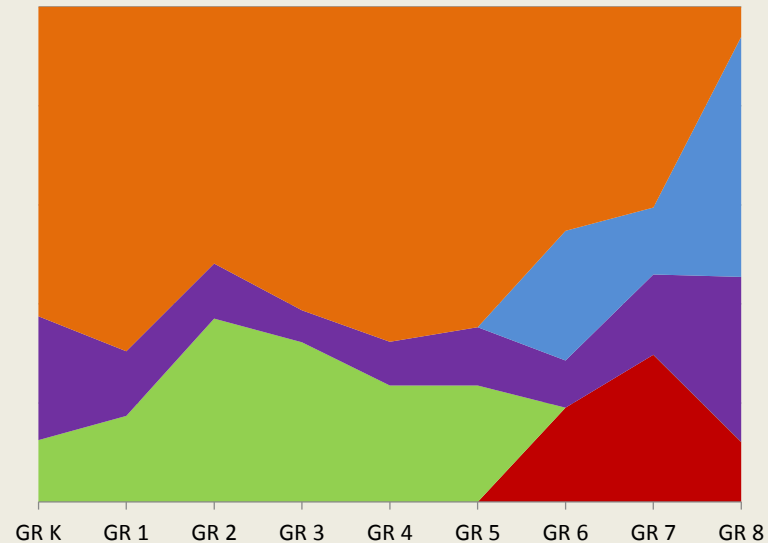


Previous vs. Current Expectations

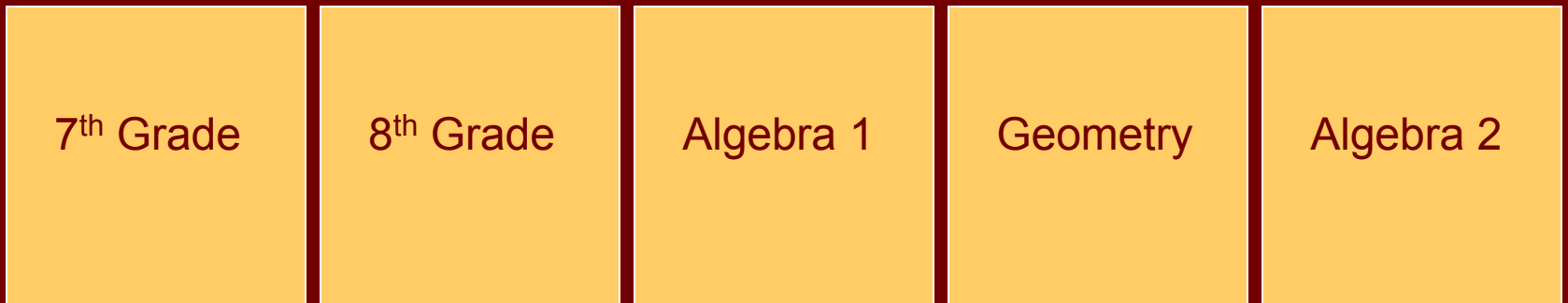
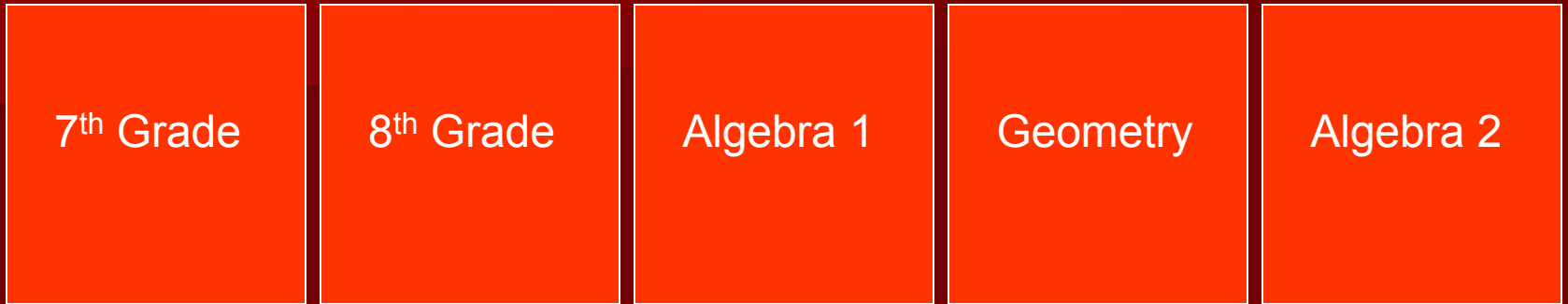
Previous State Standards



Common Core State Standards



Current Curriculum



Common Core Standards

COHERENCE

Think across grades, and *link* to major topics

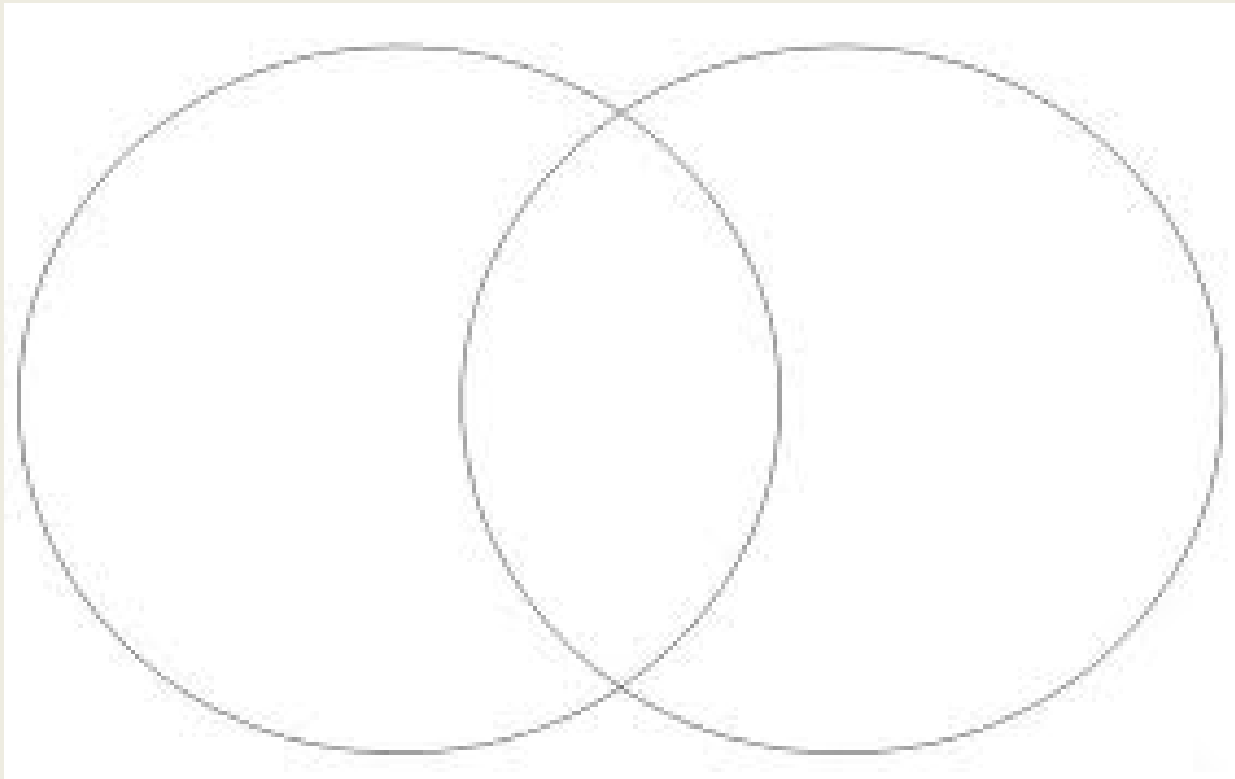


Mathematics Learning Progressions

Kindergarten	1	2	3	4	5	6	7	8	HS
<u>Counting and Cardinality</u>									<u>Number and Quantity</u>
<u>Number and Operations in Base Ten</u>						<u>Ratios and Proportional Relationships</u>			
			<u>Number and Operations - Fractions</u>		<u>The Number System</u>				
<u>Operations and Algebraic Thinking</u>						<u>Expressions and Equations</u>	<u>Algebra</u>		
								<u>Functions</u>	
<u>Geometry</u>									
<u>Measurement and Data</u>						<u>Statistics and Probability</u>			

RIGOR

In major topics, pursue *conceptual understanding*, procedural skill and *fluency*, and *application*



Do children need “to think and reason” mathematically?

Don't children need to memorize computation procedures and basic facts?

YES

Conceptual
Understanding

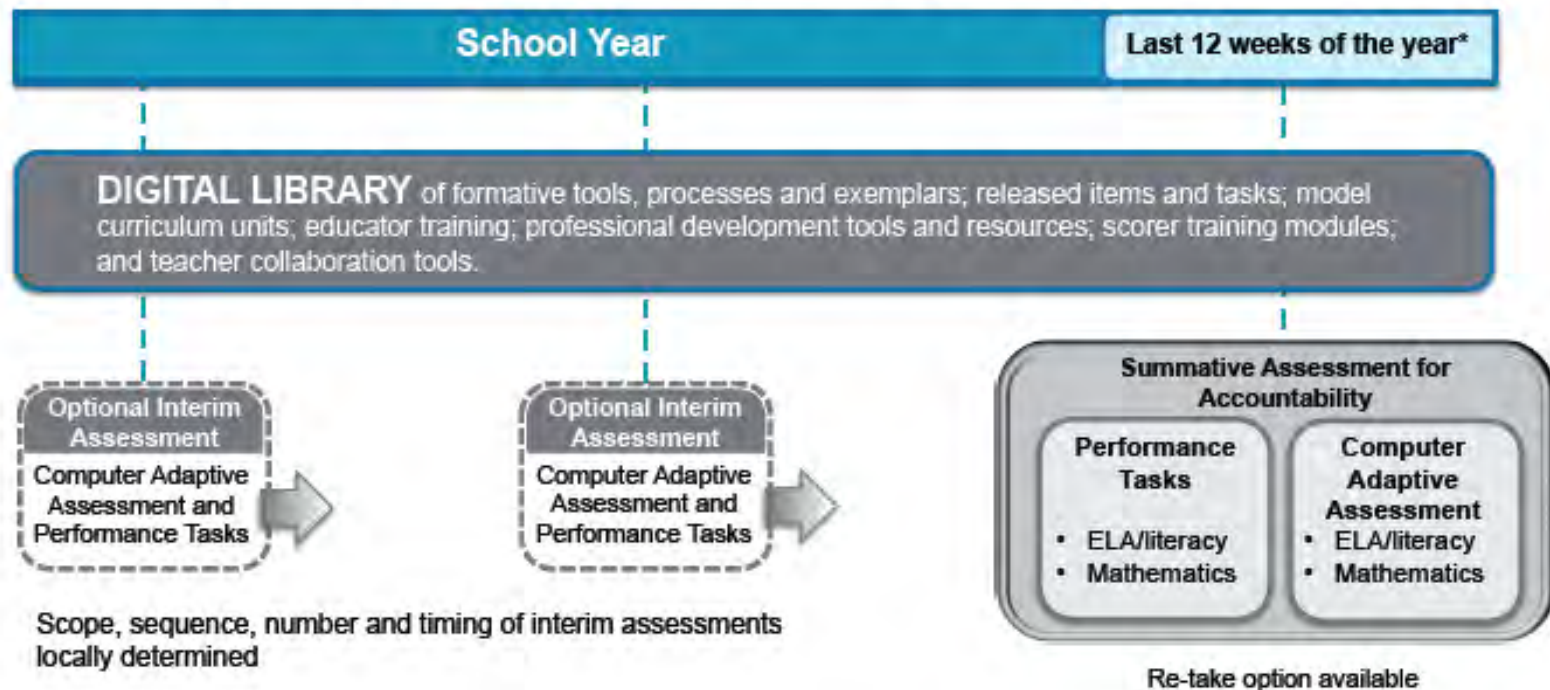
Problem
Solving and
Application

Procedural
Skills and
Fluency

“Knowing a subject means getting inside it and seeing how things work how things are related to each other, and why they work like they do.” (Hiebert et al)

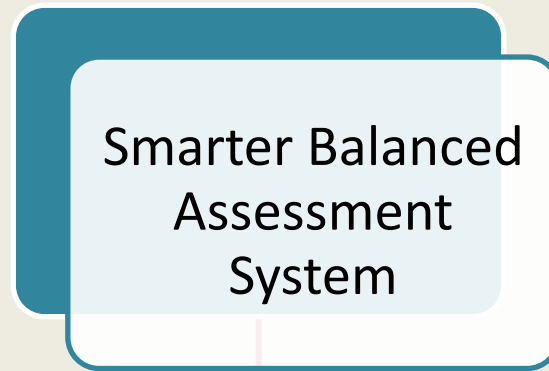
A Balanced Assessment System

ELA/Literacy and Mathematics, Grades 3-8 and High School



*Time windows may be adjusted based on results from the research agenda and final implementation decisions.

Smarter Balanced Assessment System



Formative

Interim

Summative

Formative

FAPPL

- Formative Assessment Practices/
Professional Learning
 - Digital Library Resources
 - Formative Assessment
 - Assessment Literacy
- State Leadership Teams (SLT)
- State Network of Educators (SNE)

Interim

Same grade levels as summative

- Repository of items and performance tasks for assessing the Common Core State Standards

Non-secure item bank

- Two possible methods for use—these are in transition
 - **Comparable blueprint to summative**
 - Focus on a smaller set of standards—educators can select content clusters to develop assessment

Scoring

- Test delivery system
- **Ability to include human scored constructed response and performance tasks**

Summative

Last 12 weeks of the school year

Computer adaptive

Performance tasks

More efficient

More secure

More accurate

Receive results in weeks not months

Summative Assessment: Two-pronged Approach

Computer Adaptive Test

Assesses the full range of Common Core in English language arts/literacy and mathematics for students in grades 3-8 and 11 (interim assessments can be used in grades 9 and 10)

Measures current student achievement and growth across time, showing progress toward college and career readiness

Includes a variety of question types: selected response, short constructed response, extended construction response, technology enhanced

Performance Tasks

- Extended projects demonstrate real-world writing and analytical skills
- May include online research, group projects, presentations
- Require 1 to 2 class periods to complete
- Included in both English language arts/literacy and mathematics assessments
- Applicable in all grades being assessed
- Evaluated by teachers using consistent scoring rubrics

Purpose of Smarter Balanced Assessment Approach

Content Specifications ...

- Create a bridge between standards and assessment and, ultimately, instruction
- Organize the standards around major constructs & big ideas
- Express what students should learn and be able to do



A Shift Away from “Cookie Cutter” Items

From

The numbers 0 and 1 are shown on the number line. Put a point on the line to represent the number $\frac{3}{5}$.



To

The numbers 0 and $\frac{3}{5}$ are shown on the number line. Put a point on the line to represent the number 1.



Selected Response Example

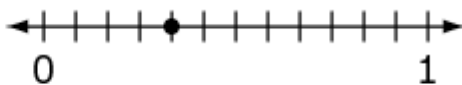
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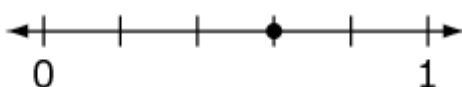
Look at point P on the number line.




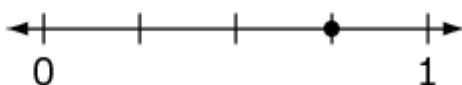
Look at number lines A – E. Is the point on each number line equal to the number shown by P ? Choose Yes or No.

A.  ☐ Yes ☐ No

B.  ☐ Yes ☐ No

C.  ☐ Yes ☐ No

D.  ☐ Yes ☐ No

E.  ☐ Yes ☐ No



Claim#1 – Concepts and Procedures

“Students can explain and apply mathematical concepts and interpret and carry out mathematical procedures with precision and fluency.”

Claim #2 – Problem Solving

“Students can solve a range of complex well-posed problems in pure and applied mathematics, making productive use of knowledge and problem solving strategies.”

Claim #3 – Communicating Reasoning

“Students can clearly and precisely construct viable arguments to support their own reasoning and to critique the reasoning of others.”

Claim #4 – Modeling and Data Analysis

“Students can analyze complex, real-world scenarios and can construct and use mathematical models to interpret and solve problems.”

Overall Claim for Grade 3-8

•“Students can demonstrate progress toward college and career readiness in mathematics.”

Overall Claim for Grade 11

•“Students can demonstrate college and career readiness in mathematics.”

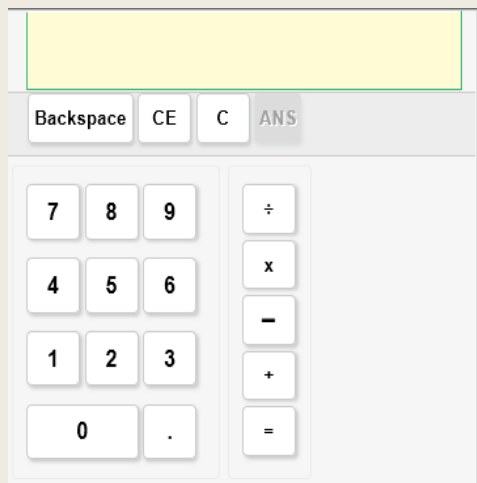
Depth of Knowledge

Table 4. A “Snapshot” of the Cognitive Rigor Matrix for Mathematics.

Depth of Thinking (Webb) + Type of Thinking (Revised Bloom)	DOK Level 1 Recall & Reproduction	DOK Level 2 Basic Skills & Concepts	DOK Level 3 Strategic Thinking & Reasoning	DOK Level 4 Extended Thinking
Remember	<ul style="list-style-type: none"> Recall conversions, terms, facts 			
Understand	<ul style="list-style-type: none"> Evaluate an expression Locate points on a grid or number on number line Solve a one-step problem Represent math relationships in words, pictures, or symbols 	<ul style="list-style-type: none"> Specify, explain relationships Make basic inferences or logical predictions from data/observations Use models /diagrams to explain concepts Make and explain estimates 	<ul style="list-style-type: none"> Use concepts to solve non-routine problems Use supporting evidence to justify conjectures, generalize, or connect ideas Explain reasoning when more than one response is possible Explain phenomena in terms of concepts 	<ul style="list-style-type: none"> Relate mathematical concepts to other content areas, other domains Develop generalizations of the results obtained and the strategies used and apply them to new problem situations
Apply	<ul style="list-style-type: none"> Follow simple procedures Calculate, measure, apply a rule (e.g., rounding) Apply algorithm or 	<ul style="list-style-type: none"> Select a procedure and perform it Solve routine problem applying multiple concepts or decision points 	<ul style="list-style-type: none"> Design investigation for a specific purpose or research question Use reasoning, planning, and supporting evidence 	<ul style="list-style-type: none"> Initiate, design, and conduct a project that specifies a problem, identifies solution paths, solves the problem, and reports results

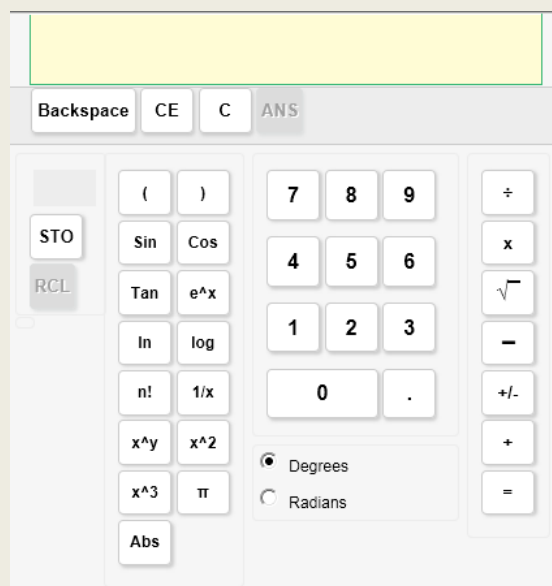
Calculators

Basic Calculator: Grade 6



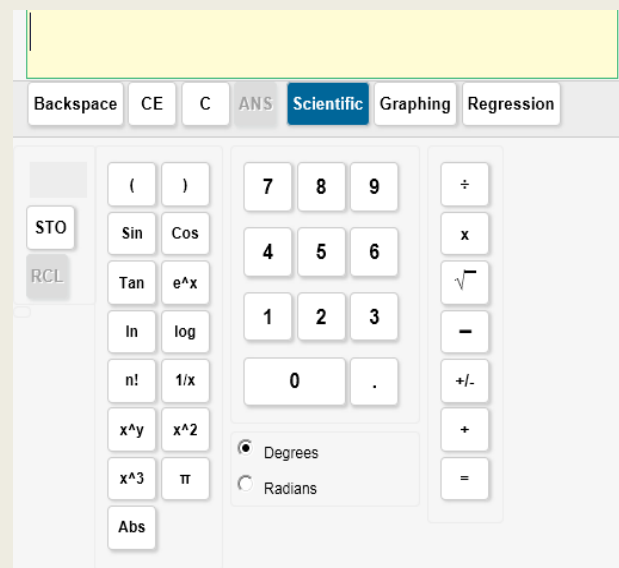
Basic Calculator

Scientific Calculator: Grades 7 & 8



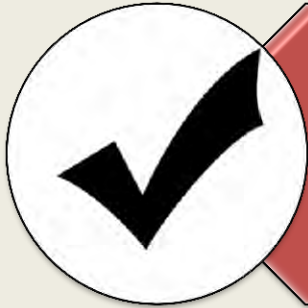
Scientific Calculator

Graphing, Regression, and Scientific Calculators: Grade 11



Graphing, Regression, &
Scientific

What can your school/district do right now to prepare for the Smarter assessments?



Build a District/School Smarter Team

- Administration
- **Test Coordinator**
- IT staff
- Special Needs
- Data staff

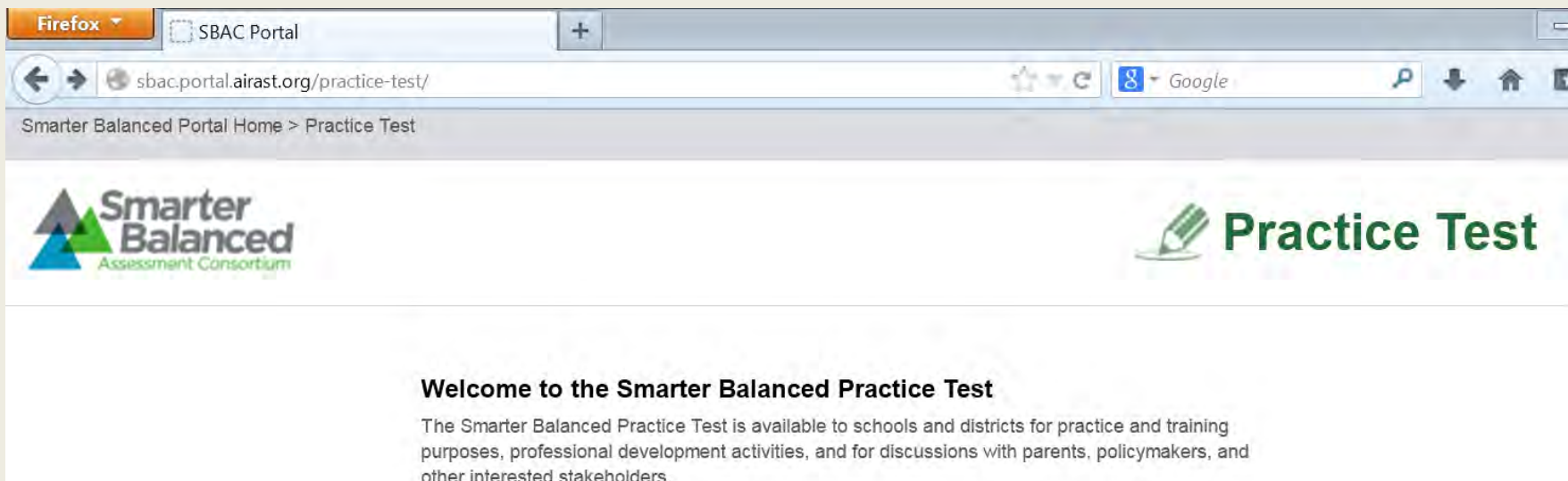


Use technology readiness tools



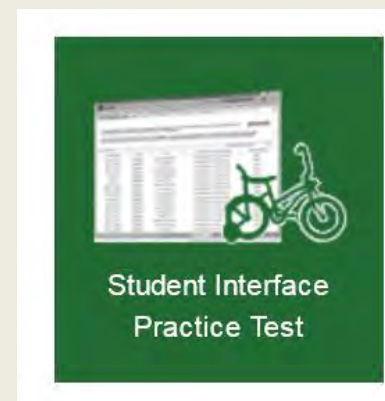
Use online practice tests

Practice Test Portal



NOTE! The practice test can ONLY be opened in the following browsers:

- Mozilla Firefox
- Google Chrome
- Microsoft Internet Explorer 10
- Apple Safari
- <http://sbac.portal.airast.org/practice-test/>



Getting on Board with the Mathematics

Grade 4 Practice Test Item

9

Drag one number into each box to complete the subtraction problem shown.

0
1
2
3
4
5
6
7
8
9

$$\begin{array}{r} 50\Box6 \\ - \Box48\Box \\ \hline 16\Box8 \end{array}$$

Grade 7 Practice Test Item

8

Tim makes 80 gallons of paint by mixing 48 gallons of green paint with 32 gallons of blue paint.

What part of every gallon is from green paint?

The model represents 1 gallon of mixed paint.

Select the bars to show how much of the gallon is from green paint.

1 gallon

Grade 11 Practice Test Item

4

The graph of a polynomial function is shown.

$(x + 1)$
 $(x - 1)$
 $(x + 2)$
 $(x - 2)$
 $(x + 3)$
 $(x - 3)$
 $(x + 4)$
 $(x - 4)$

$f(x) =$

Create a possible function for the graph.



Implications for Instruction

For the problems you solved:

- What are the content expectations for current grade, previous grades, and subsequent grades?
- What are the mathematical practices expectations?
- What are the implications for instruction?
- What instructional strategies could be implemented to enhance the students' learning towards the assessment goals?

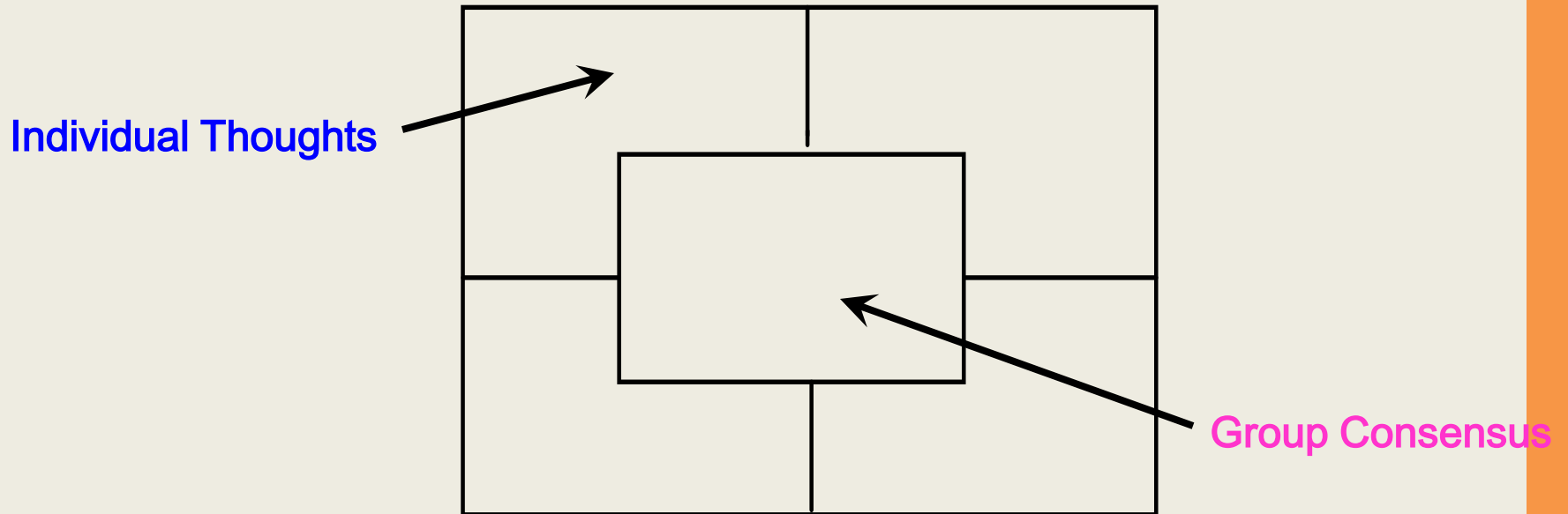
Implications for Instruction

- We are going to use an activity called **Placemat** to capture your thoughts for these assessment items using the same questions:
 - What are the content expectations for current grade, previous grades, and subsequent grades?
 - What are the mathematical practices expectations?
 - What are the implications for instruction?
 - What instructional strategies could be implemented to enhance the students' learning towards the assessment goals?

Placemat

Participants individually write down their thoughts about a topic, then the group prepares a consensus product that reflects the thoughts and ideas of all group members.

Placemat



Roles:

Skeleton Maker	3
Facilitator	1
Recorder	4
Timekeeper	2

Implications for Instruction (Individual)

There will be 30 minutes in total for the Placemat activity.

Individually in your corner of the Placemat using your marker color:

- Reflect on the implications for instruction for the practice test items you solved using the following questions as starting points:
 - What are the content expectations for current grade, previous grades, and subsequent grades?
 - What are the mathematical practices expectations?
 - What are the implications for instruction?
 - What instructional strategies could be implemented to enhance the students' learning towards the assessment goals?

Implications for Instruction (Group)

As a group:

- Timekeeper: Keep tabs on the 30-minute time allotment and provide updates on time remaining periodically to your group.
- Facilitator: When individuals are winding down their initial thinking, initiate a discussion for each group member to share what they thought were the implications for instruction for their assessment items.
- Recorder: Summarize the discussion in the group product space in the middle of the Placemat. You may want to use the four questions as an organizational tool.
- Everyone initial on the group consensus product that you agree with the synthesis and can share it.

Implications for Instruction

Share your group's consensus thoughts:

- What are the content expectations for current grade, previous grades, and subsequent grades?
- What are the mathematical practices expectations?
- What are the implications for instruction?
- What instructional strategies could be implemented to enhance the students' learning towards the assessment goals?

Recap the Goals for This Session

- Overview of Montana Common Core Standards (MCCS) and Smarter Balanced Assessment
- Familiarization with the Smarter Balanced online Practice Test
- Discussions on instructional practices using standards documents and sample SBAC items

Questions?

- Please look at the questions you set aside at the beginning of the presentation.
- We would like to address any remaining questions you may have about the SMARTER Balanced Assessment and the implications for instruction.

Thank You!

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- Patricia (Pat) Baltzley
 - patcreel1@gmail.com